WILLIAM T. PECORA AWARD

Dr. Crofton Bernard Farmer

In recognition of his outstanding achievements in the use of remote sensing for the scientific investigation of chemical processes leading to the depletion of stratospheric ozone.

Dr. Farmer is an internationally renowned atmospheric physicist who led the development of near-infrared Fourier Transform spectroscopy for highly sensitive atmospheric measurements. He was the first to detect stratospheric nitric oxide and to determine accurately the levels of reactive oxides of nitrogen in the stratosphere. In 1974, Dr. Farmer was awarded the first of three NASA Exceptional Scientific Achievement Medals for developing an instrument to measure simultaneously the concentrations of many neutral molecular species in the Earth's atmosphere. During the flight of this instrument on the NASA U-2 aircraft, he made the first detection of hydrogen chloride in the stratosphere. Later, he used balloons to measure the vertical distribution of hydrogen chloride, demonstrating that hydrogen chloride was generated in the stratosphere. He subsequently confirmed the anthropogenic origin of stratospheric halogens by deducing the varying ratio of hydrogen chloride to hydrogen fluoride from spectroscopic measurements.

For over 20 years, Dr. Farmer has provided insightful leadership in the NASA stratospheric measurements program, using instruments on stratospheric balloons. This program significantly contributed to understanding the ozone depletion phenomenon over Antarctica. In 1985, he made the most advanced measurement of the composition of the Earth's upper atmosphere when his Atmospheric Trace Molecule Spectroscopy (ATMOS) instrument flew on the Space Shuttle Spacelab 3. ATMOS obtained simultaneous spectra of 40 different atmospheric constituents, including the first detection of nitrogen pentoxide, chlorine nitrate, carbonyl fluoride, and peroxynitric acid, along with concentration profiles, at altitudes ranging from 5 to 160 kilometers. This extensive data set provided precise measurements of nearly all the important interacting species and their spatial and temporal variation so that the complex process of ozone depletion chemistry could be examined. Subsequent ATMOS flights showed that halogens were increasing continuously in the stratosphere, and provided the baseline to validate species-specific instruments.

In the austral spring season of 1986, Dr. Farmer examined the column abundance of ozone and other molecular species "suspects" with his Mk IV Interferometer from McMurdo Station in Antarctica. In 1987, he extended these ground-based measurements during the high-latitude airborne campaigns over the Antarctic. Many chemical species were measured, which significantly improved our understanding of the cause-and-effect relationship between anthropogenic chlorine and the "ozone hole."

In recognition of these accomplishments, the Department of the Interior and the National Aeronautics and Space Administration take pleasure in granting the 1996 William T. Pecora Award to Dr. Crofton Bernard Farmer.

Secretary of the Interior

Administrator
National Aeronautics and Space Administration